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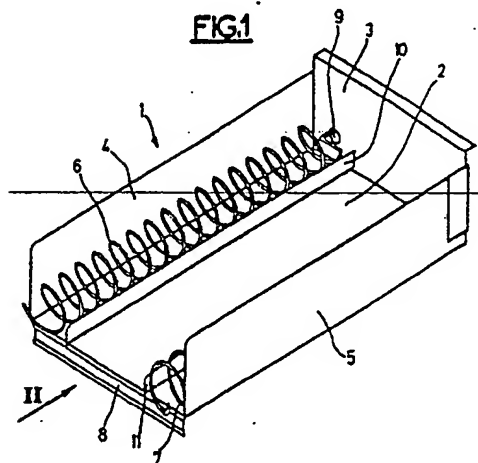
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(54) Screw Type Device for Product Distribution

(57) Device for distribution of products comprising at least one screw (6 and 7) with a mainly horizontal axis, suitable for being driven in rotation one turn at a time to advance one by one the products placed between consecutive spirals of the screw, and at least two long supports (10 and 11), extending mainly parallel to the screw's axis at a height such that the products placed between the screw's coils can be supported by the supports and not rest on the screw which only ensures the advancing of the products.

Application: notably for the automatic distribution of relatively heavy or bulky products, shaped like a cylinder, parallelepiped, etc. or packaged in packaging having such shapes.



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Screw Type Device for Product Distribution

The present invention relates to a device for distribution of products including at least one coil or screw with a mainly horizontal axis suitable for being driven in rotation one turn at a time for distributing products placed between the device's consecutive spirals one by one at one of its ends.

Devices of this type are used in automatic distributors of various products, for example candies and chocolates. In these well-known distributors, the products are placed between the consecutive coils of a screw (or of several parallel screws) made of metal wire and placed on the horizontal bottom of a tray which can be pulled out of the distributor to allow the reloading of the screw with products. Therefore, the products rest on the screw's coils, which can cause friction between the products and the screw during the screw's rotation. For driving the screw it is therefore necessary to provide a motor having sufficient power to overcome this friction.

The US patent 3,344,953 (Krakauer) and the French patent application 2,266,231 (Rowe) describe devices of this type in which longitudinal elements for supporting and guiding the products driven by the screw are provided inside the coils of each screw. A single screw kept in place by its internal support element is provided for each group of products, additionally guided by two lateral walls.

In the US patent 3,883,039 (Wittern) each screw is supported inside a sort of longitudinal gutter whose rims serve to support and guide the group of products that the screw transports.

All these known devices are suited to products that are light and not bulky.

Depending on the weight and/or the type and/or the consistency of the products to be distributed, these known distributors are not always satisfactory, to the extent that they necessitate the use of powerful drive motors and/or cause a deformation of the products, or even damage or jamming.

The subject of the present invention is a screw type distribution device that makes reliable distribution possible for even those products whose weight and/or type and/or consistency cause problems for the known devices.

In particular, the subject of the invention is such a screw distribution device which is adapted to heavy and bulky products, notably long cylindrical products.

The device conforming to the invention for distribution of products by driving a coil or screw with a mainly horizontal axis, suitable for being driven in rotation one turn at a time to advance the products placed between consecutive coils of the screw, in which the products are guided by a long support extending in a manner largely parallel to the screw's axis, includes two parallel screws and at least two supports placed outside the screw's coils and extending up to a height such that a product is practically only in contact with the upper portion of both screw's coils.

Since the two functions of advancing and supporting the products are separated, it is possible to make each of the elements fulfilling one of these functions, specifically the screw on the one hand and the supports on the other hand, in a manner that they can fulfill their function in an optimal manner considering the product to be distributed.

The separation of the two functions offers particular advantage in case of distribution of products likely to roll (cylindrical products or products having other shapes of rotation), to the extent that these cylindrical products resting on the supports can roll, meaning can advance nearly without friction on these supports. Just the same, the separation of the two functions is also advantageous for products which do not roll but which advance by sliding on the supports. In fact, these supports can be designed to reduce the friction which is produced during sliding of the products on the supports to a minimum, for example through the fact that the supports have a profile and/or are made of a material or fitted with a material reducing as much as possible the friction between the products and the supports.

Since the products are only in contact with the upper part of the coils, the friction is reduced, which makes it possible to distribute heavy and bulky products without noticeably increasing the power of the motors driving the screws.

In a preferred method of execution, the distribution device includes two screws and two supports placed between the two screws.

In a variant, the device can include two screws and three supports with a support placed between the two screws and two supports placed on either side of the two screws.

The sense of pitch and the sense of rotation of both screws are preferably such that both screws tend to move apart from each other during their rotation. Therefore the two screws do need to be kept in place or guided, and they don't risk coming into contact which it is of course appropriate to absolutely prevent.

Further, the screw's pitch is preferably greater than its diameter, specifically of order twice the diameter. Thus, bulky objects can be accepted between the coils and the lateral motion of the screws remains limited.

By referring to the attached drawings, several illustrative and non-limiting means of executing a distribution device conforming to the invention will be described below; on the drawings:

Figure 1 is a perspective view of an automatic distributor drawer equipped with a distribution device having two screws and two supports.

Figure 2 is a view of the device from Figure 1 taken in the sense of arrow II.

Figure 3 is a view corresponding to that of Figure 2 for another method of executing the device in conformance with the invention.

Figure 4 is an enlarged cross-section along IV-IV from Figure 2.

As shown in Figure 1, a drawer 1 for an automatic product distributor is formed of a horizontal bottom 2, a rear vertical wall 3 and two lateral vertical walls 4 and 5. At the front end, the drawer is empty, meaning it does not have vertical wall.

On drawer 1, two spirals or screws 6 and 7 are placed extending to the bottom 2, each near one of the lateral walls 4 and 5. The screws 6 and 7 are for example made up of metallic wire and have a pitch (distance between two consecutive coils) suited to the thickness of the products to be distributed and extending from the rear extremity of drawer 1 (rear wall 3) to the front edge 8 and even preferably a little bit beyond the front edge 8 of the drawer 1. The opposite end of each screw 6 and 7 passes through a hole 9 in the rear wall 3 in order for the screw 6 and 7 to be driven in rotation by a drive system, preferably a gear motor with two outputs simultaneously driving both the screws 6 and 7.

Between the two screws 6 and 7, the bottom 2 of the drawer 1 has two long supports 10 and 11 with a flat rod shape the length of both screws 6 and 7 extending the entire depth of drawer 1.

As shown in Figure 2, the height of the supports 10 and 11 is such that the products 12 placed between consecutive coils of both screws 6 and 7 are supported by the supports 10 and 11 and do not rest

on the screws 6 and 7. Products 12 are solely in contact with the upper half of the coils of screws 6 and 7 as seen from Figures 2 and 4.

Because of this, the screws 6 and 7 serve only to move the products 12 forward but not to support them, so the friction is notably reduced.

The supports 10 and 11 are placed outside the coils of screws 6 and 7, and between them.

This screw 6 has a pitch to the left and is driven in a counterclockwise sense according to the arrow 6a. The screw 7 has a pitch to the right and is driven in a clockwise sense according to the arrow 7a. Consequently, during this simultaneous rotation to advance the product 12, the two screws 6 and 7 which rest freely on the bottom 2, tend to move apart from each other. This weak movement constitutes a safety feature of the device from the invention, in particular in the case where the two supports 10 and 11 are not placed between the screws 6 and 7 but on the other side, to the outside of the screws 6 and 7 leaving the space located between the screws 6 and 7 free.

It is understood in fact that it is appropriate to absolutely avoid any contact between the screws 6 and 7, a contact which could happen if said screws had a tendency to approach each other.

According to Figure 3, a drawer 1 for an automatic distributor includes two spaced screws 13 and 14 and three supports 15, 16 and 17 with specifically one support 15 extending in median position between the two screws 13 and 14 and two supports 16 and 17 placed on both sides of the screws 13 and 14. Aside from this modification, the device is identical to that from Figure 2.

In Figure 4, it can be seen that the product 12, which has a cylindrical shape, is pushed towards the left by a rear coil of the screw 6 by coming in contact with its upper part. The pitch of screw 6 is of order twice its diameter, such that the product 12 does not come in contact with the front coil of the screw 6 because of the fact that the product 12 is supported by the supports 10 and 11 roughly at the level of the median plane of screws 6 and 7.

In Figure 4 another product 18 with a rectangular cross section is shown in dashes; this product can be pushed by the screw 6 while sliding on the supports 10 and 11 whereas the cylindrical product 12 can roll on the supports 10 and 11.

The screws 6, 7, 13 and 14 can be made of metal wire with a thickness which depends on the weight of the products to be distributed and the number of products likely to be distributed by each screw. The pitch of the screw depends on the thickness of the products to be distributed, such that each product can be placed between two consecutive coils. The pitch of the screws is however

preferably greater than their diameter, notably of order twice the diameter, which makes it possible to receive bulky objects and limit the friction.

The supports 10, 11, 15, 16 and 17 can for example be made of flat sheet metal, as shown in Figure 1, notably when the products to be distributed have a cylindrical shape and can roll on the supports. However, in the case of distributing products which are not cylindrical and which therefore slide on the supports when being moved forward by the screws, it is also possible to give the supports different cross-sections and/or to make them from different materials, notably materials with a low coefficient of friction or to fit them with such materials.

The invention can advantageously be used to distribute heavy and bulky products, in particular cylindrical packaging tubes capable of containing various products and notably clothing.

7. Application of the device according to one of the previous claims for distribution of cylindrical products capable of rolling on the supports under the action of the coils of both screws acting in the vicinity of the ends of the products.

CLAIMS

1. Device for distribution of products by driving a coil or screw with a mainly horizontal axis, suitable for being driven in rotation one turn at a time to advance the products placed between screw's consecutive coils; in which these products are guided by a long support extending in a manner largely parallel to the screw's axis, characterized by the fact that it includes two parallel screws and at least two supports placed outside the screw's coils and extending up to a height such that a product is practically only in contact with the upper portion of both screws' coils.

2. Device according to Claim 1, wherein it includes two supports (10 and 11) placed between the two screws.

3. Device according to Claim 1, wherein it includes a support (15) placed between the two screws and two supports (16 and 17) placed on either side of the two screws.

4. Device according to any of the previous claims wherein the sense of the pitch and the sense of rotation of both screws is such that the two screws tend to move apart from each other during their rotation.

5. Device according to Claim 4 wherein the two screws have opposite pitch and turn in the opposite sense.

6. Device according to any of the previous claims wherein the pitch of the screws is larger than their diameter and preferably of order twice their diameter.

FIG.1

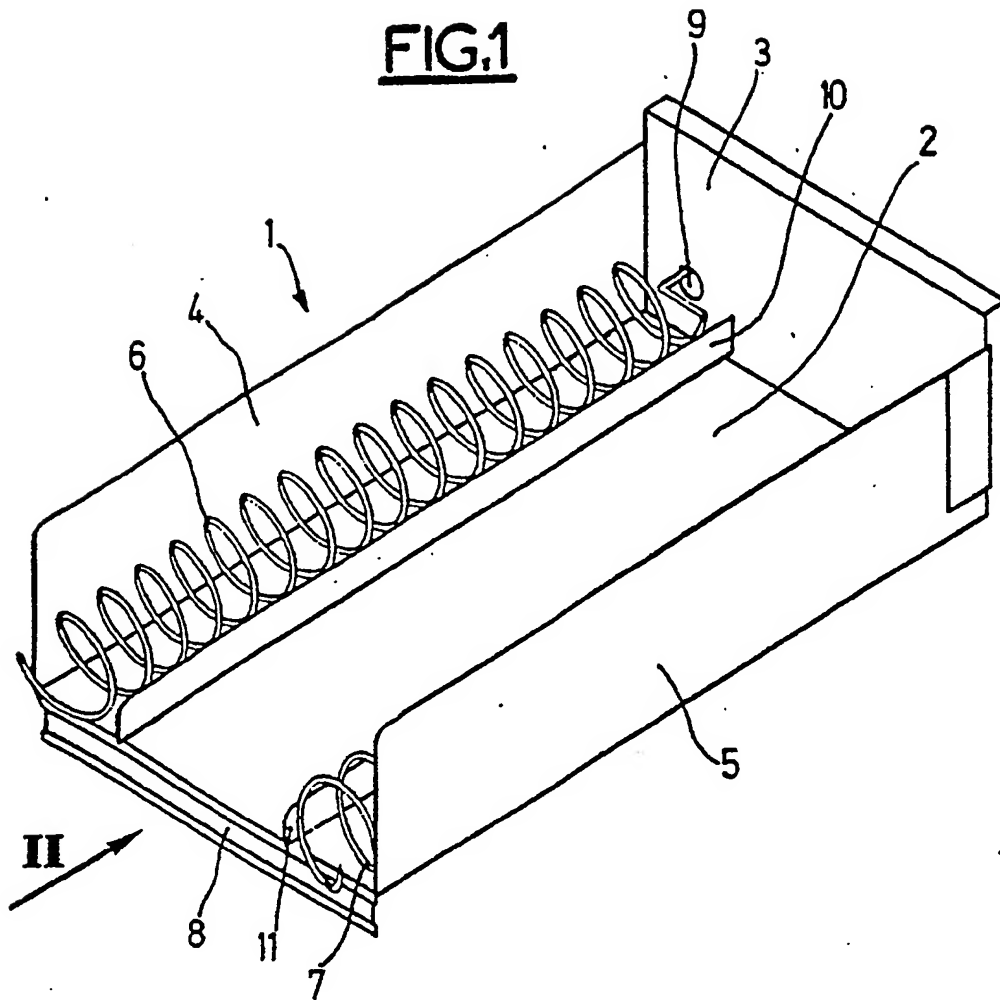


FIG.2

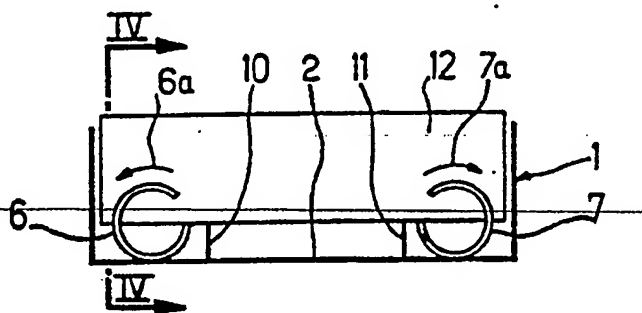


FIG.3

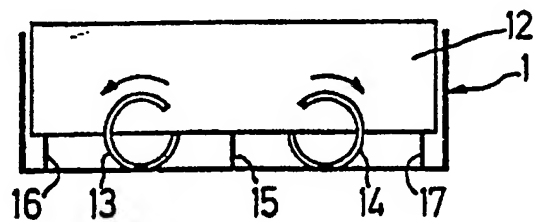
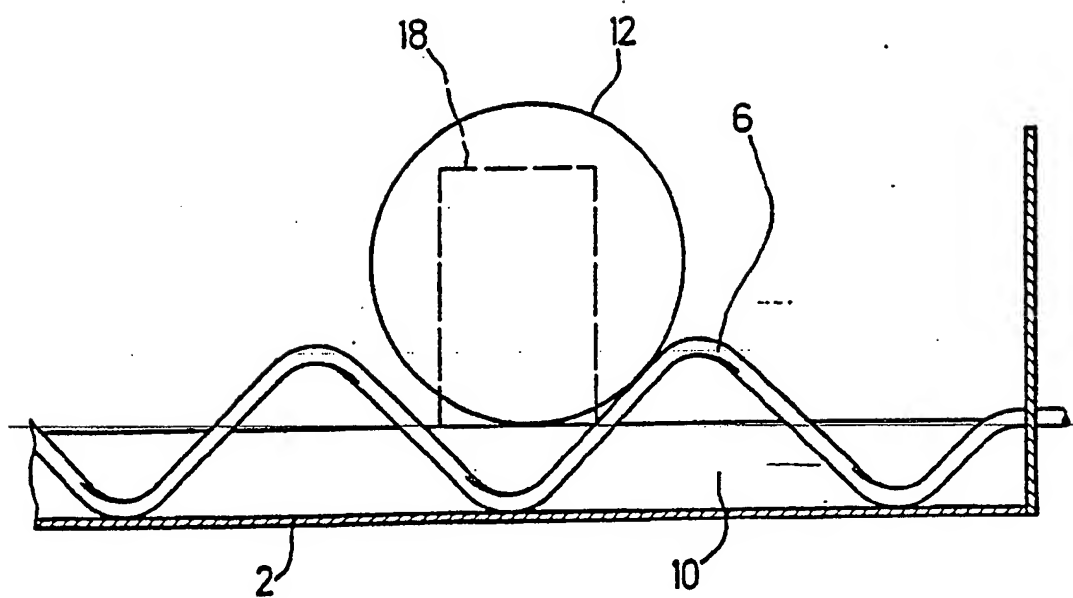


FIG. 4





European
Patent
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European Research Report

Application number

EP 87 11 1321

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|--|---|---|
| Category | Citation of Document, with indication, where appropriate, of the relevant passages | Relevant to Claim No. | Classification of the Application (Int. Cl. ⁴) |
| A | US-A-3,883,039 (F.A. Wittern) * Abstract; Figures 1-3; column 3, lines 39-54 * | 1, 3 | G 07 F 11/42 |
| A | FR-A-2,266,231 (Rowe International) * Figures 2 and 7; page 5, lines 3-38 * | 1, 2, 5 | |
| A | US-A-3,344,953 (M. Krakauer) * Figures 4 and 5; column 4, line 36 – column 5, line 17 * | 1 | |
| A | BE-A- 700,604 (Dynavend) * Figures; abstract * | 1, 6, 7 | |
| A | US-A-3,993,215 (R. N. Cox) | | |
| The present report was prepared for all the claims. | | | Technical Domains Searched (Int. Cl. ⁴) G 07 F |
| Search Location La Haye | | Date search completed 11/23/1987 | Examiner J. Y. H. David |
| <p>• Special categories of cited documents: ¹⁰</p> <p>"X" document of particular relevance on its own</p> <p>"Y" document of particular in combination with another document from the same category</p> <p>"A" background technology</p> <p>"0" unwritten disclosure</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> | | <p>"T" theory or principal at base of invention</p> <p>"E" earlier patent document but published on or after the filing date</p> <p>"D" cited in the application</p> <p>"L" cited for other reasons</p> <p>"&." member of the same family, corresponding document</p> | |

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Certificate of Accuracy

This is to certify that the attached document, *Screw Type Device for Product Distribution*, originally written in *French* is, to the best of our knowledge and belief, a true, accurate and complete translation into *English*.

Dated: July 7, 2005

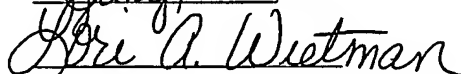


Sandra McNamara
Project Manager
Merrill Brink International

Sworn to and signed before

Me this 7th day of

July, 2005



Notary Public

